SYMONS'S

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THE FIRST DAILY WEATHER MAP, SOLD IN THE GREAT EXHIBITION OF 1851.

IT is not safe to claim priority for anything, especially while Dr. Hellmann is working in the same direction; but we have not much fear of the above heading being disproved. It will be noticed that we do not say "The First Weather Map," because maps representing atmospheric conditions on special days had been produced many years earlier; they were, however, records of the past, representations of the facts observed months or years before; whereas, by a Daily Weather Map is meant a map published the same day, and containing information transmitted by electric telegraph.

Admiral FitzRoy never published a Daily Weather Map, and his successors, the Meteorological Council, did not give us one until 1872. Le Verrier issued his first on Sept. 16th, 1863; and this, Prof. Harrington in his "History of the Weather Map" *(Chicago Congress)* considered to be the first.

We have the pleasure of presenting our readers with a reduced copy of the first of a series of such maps issued *twelve years earlier.*

We have not yet obtained all possible information respecting it, and, therefore, will now state only, that (1) the accompanying map is rather more than a quarter the size of the original, which is 10·2 in. by 7·2 in. (260 × 183 mm.); (2) that the daily issue continued from August 8th to October 11th, 1851, Sundays excepted; (3) that they were sold daily in the Great Exhibition; and (4) that the Royal Commissioners have kindly lent us the set whence the annexed reproduction has been made.

When we have concluded our enquiries, we hope to lay the results before our readers.

THE BOOK OF KNOWLEDGE.—ISOBARS.—ESCHUID.

To the Editor of the Meteorological Magazine.

SIR,—Your supposition about Godfridus seems to me quite right. Melampus means Black Foot; the name of this old Greek author is placed upon the title page for the same reason as that of Godfridus, viz.: to give importance to the book. Another fictitious author figures on the title page of the edition of 1750 which I possess:

> "Written by *Erra Pater*, a Jew, Doctor in Astronomy and Physick, born in Bethany, near Mount Oliver, in Judea. Made English by W. Lilly, Student in Physick and Astrology." (1)

May I, at the same time, put two questions:—(A) Who was the first to draw (and publish) mean isobars of a country? Is there an earlier map of such isobars than that of France, by E. Renou? (*Annuaire Soc. Mét. de France* 1864). (B) Who first used the word *isobar*? Perhaps Mr. Babington, in FitzRoy's office? (2)

Can anyone tell me anything about the author of the large astro-meteorological work known under the abbreviated title *Summa Anglicana*, printed at Venice in 1489? The author is called *Eschuid*, but this is no English name. The work was written about 1347, by a Fellow of Merton College, Oxford, at the same time as, or a little later than, when another Fellow of the same College (Merle) kept the earliest journal of the weather. In manuscripts of the *Summa Anglicana*, which are numerous, the author's name is spelled

Joannes de Ashenton.
„ „ Ashedene.
„ „ Eschendenis.
„ „ Escheudn.
„ „ Aschelden.
„ „ Esschyngden, &c., &c. (3)

Yours very truly,

G. HELLMANN.

August 19th, 1896.

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(1) We do not quite understand Dr. Hellmann classing Erra Pater's book with Godfridus's, there seems to us so little in common—of Erra Pater there are in the British Museum editions of 1535, 1540? 1600? 1606, 1607? 1630? (two editions), 1700, 1746, 1780, and 1794.

(2) In Admiral FitzRoy's *Weather Book*, 1863, p. 106, he uses the word "isobarometric," whence isobar was a natural contraction.

(3) Dr. Hellmann may well put "&c., &c."; in *Houzeau* we find Aysheden, Aschyden, and Eshuid; *Gesner* gives Estuidius, and the *Crawford Catalogue* gives as the English equivalent, Eastwood. We have no authority for the suggestion, but think that it was probably a member of the old Lancashire family of Assheton.—ED.

Mr. C. Leeson Prince has kindly lent us his copy of

> THE SHEPHERD'S KALENDER; or THE CITIZEN'S AND COUNTRY MAN'S DAILY COMPANION . . . . Infallible signs of the weather, to know when wet or dry, and when sudden storms arise . . . . being about Forty years study and experience of a Learned Shepherd. 5th Ed. London. Printed for C. Hitch at the Red Lyon in Paternoster Row; R. Ware, at the Sun and Bible on Ludgate Hill; and J. Hodges at the Looking-glass on London Bridge. *No date but probably* 1705. 12mo.

This book indicates on how large an enquiry anyone would enter who tried to follow the influence of *The Book of Knowledge*. Pages 15 to 43 (really 51, for the printer has made a mistake and used the numbers 41 to 47 twice) are crammed with weather proverbs, and it is certain that the writer had *The Book of Knowledge* before him, but the quotations are never verbatim, and usually each sentence taken from Godfridus is about half copy and half original. The preface is signed J. S., but we do not know who was the author—he however gives a remarkable collection of weather proverbs, and if Mr. Inwards or anyone else, instead of merely collecting proverbs, tries to trace them back to their origin, this work must not be overlooked. But what with *The Husbandman's Guide*, *The Shepherd of Banbury's Rules*, and *The Shepherd's Kalender*, and the uncertainty as to the date of the first issue of each, the task would not be easy.

We regret having passed an error on p. 104; the edition of 1676 (like most of those dated between 1673 and 1697) was printed for W. Thackeray; the entry W.G. should be W.T.

DRY PERIODS.

Under date of August 1st, Mr. G. J. Symons wrote to *The Times* pointing out that at Camden Square—

(1) The Rainfall of the first seven months of 1896 (8·27 in.) is only 60 per cent. of the average for the 37 years 1859-95.

(2) Out of the 38 years 1859-96, there are only eight in which the fall for the first seven months did not exceed 10 inches, only three of these cases occurring in the first 28 years of the period, while five cases occur in the last 10 years.

(3) The average for the first seven months during the 28 years 1859--86 is 14·24 in., while during the 10 years 1887-96 it is only 11·65 in.

(4) There has been no month since 1880 with a rainfall exceeding five inches, or with a fall of thrice the average.

Commenting on the above, Mr. James M. Fraser, of Lochmaddy, in the Hebrides, writes, "The average rainfall for the first eight

months of the twelve years 1884–95, inclusive, is 27·78 in. This year the total for the first eight months is 34·86 in. Again, though the average for the first eight months, 1884–89, inclusive, is 25·46 in., the average for the first eight months, 1890–95, inclusive, is 30·11 in. These figures show that there is a heavy yearly increase in the rainfall in this district in the first eight months in each year. I mention this with special reference to your communication to the *Times*, about the beginning of August, on the increasing deficiency in the rainfall in the London district in the early months of the past number of years. My figures are from a table which I carefully prepared, and I only regret that my records do not go further back than 1884. It is strange that the London deficiency should be made up here—the opposite extreme of the kingdom."

This is not the first time that attention has been called to a deficiency in one part of the United Kingdom, extending over several years, being, in a sense, compensated by a similar excess in another district.

HEAVY RAINS AT THE BEGINNING OF SEPTEMBER, 1896.

Haslemere, Hazelhurst.—On September 2nd a sharp shower occurred at 2 p.m., and at 4.45 p.m. a sharp TS occurred, and a house in the town was struck by L, the curtains being set on fire. The R ceased at 5.45, and at 6 p.m. there was 1·03 in. in the gauge, most of which fell between 5 and 5.40 p.m. There was continuous R through the night, and the total to 10 a.m. on 3rd was 2·21 in.

T. P. NEWMAN.

Dorking, Fir Tor.—Between 1 p.m. on 1st and about 8 p.m. on 2nd, 3·40 in. of R fell. Of this, 2·75 in. fell in 20 hours between 1 p.m. on 1st and 9 a.m. on 2nd. The nearest approach to this fall was on July 14th to 16th, 1875, when 2·91 in. fell in 48 hours.

F. TAYLOR.

Reigate, Doods.—I found in the rain-gauge for the 24 hours ending 9 a.m., September 2nd, 2·27 in., which is the maximum fall since and including 1882. The R commenced at 11 a.m., slight at first, then a succession of heavy storms (accompanied by loud T and vivid L between 3 and 5 p.m.), continuing until the early morning.

G. E. PYM.

Upper Gatton.—I measured 1·88 in. of R as the fall for 24 hours ending 9 a.m. on 2nd. Most of this fell between 3.45 and 5.30 p.m., at 7.15 p.m., and at 9.30 p.m.; but the R was almost without intermission from noon to midnight.

F. DRUCE.

Sheppey, Leysdown.—Rainfall, September 1st to 7th :—

	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	Total.
	in.	in.	in.	in.	in.	in.	in.	in.
London, *Standard* Office	·32	1·61	—	·23	·48	·08	—	2·72
Leysdown, Kent	·05	·01	—	·29	·01	·08	·03	·47

A. FARBROTHER.

Milford-on-Sea.—On September 8th a fearful TS came on suddenly at 8 p.m., lasting till 11 p.m. L continuous and very brilliant, and very heavy H. R ·75 in. The storm was worst from 10 to 10.30 p.m., with probably more than ·50 in. in the half-hour.

A. F. PARBURY.

Bury St. Edmunds, Westley.—We had a tremendous rain on September 1st (2·10 in.), most of it fell between 5 and 6 in the evening.

R. BURRELL.

Wimborne, Chalbury.—Rainfall here, September 3rd, 1·11 in.; 4th, 1·84 in.; 5th, ·51 in. The 2·95 in. in two successive days is unprecedented.

G. H. BILLINGTON.

WHIRLWINDS.

BRIDGWATER, JUNE 9TH.

ON Tuesday afternoon (June 9th), at about 4.20 p.m., the neighbourhood of Bridgwater was visited by a small cyclone or whirlwind. This somewhat rare phenomenon must not be confounded with the ordinary cyclonic disturbance or "depression" which is the usual cause of the low barometer, rain and gales of the winter months, and which is generally of sufficient size to cover the whole of the British Isles. The true whirlwind or cyclone, of which we have recently received such terrible accounts from America, is of much smaller dimensions, often covering a track only a few yards wide, but where it passes it scatters wholesale destruction to trees and buildings, and when it passes over the sea it carries up the waves with it in the form of a waterspout.

The cause of this phenomenon is doubtless the electric tension existing between the clouds and earth, which, after long periods of dry weather often becomes very great, but usually passes off in the milder form of the thunderstorm. The typical or perfect whirlwind should show a revolving funnel of cloud, the broader end joining the clouds above, while the lower end comes down towards the ground, and, if near enough, it causes a corresponding whirling motion on the surface of the earth, carrying up such things as hay, or boughs of trees, and dust, and if of greater violence dealing out flashes and balls of lightning as it moves slowly along over the country.

From a report sent to the *Avalon Independent* it appears that at about 4 o'clock on June 9th a small whirlwind was formed near Glastonbury, which carried up 40 or 50 tiles from some cottages, and also conveyed a basket some distance through the air. It then seems to have gone up again to the clouds, but may have been the commencement of the one which visited Bridgwater a little later.

From what we can gather, the Bridgwater whirlwind was formed not far from Dunwear, or between that place and Chedzoy, in the form of a long "tail" of black vapour hanging from the clouds, that

it then moved towards Chedzoy ((*i.e.*, was going N.), where it was met by an advancing storm cloud, into which it seemed to merge, and then to turn back again towards the south, and immediately to lower itself among the tree tops with a roaring noise. We have been told that two men were milking cows in a shed near Dunwear, and that the whole covering of the shed was removed, leaving only the skeleton, but we have not seen it. As the revolving wreaths of cloud drove through the trees, they fell before it in rows, until in a few moments about forty trees were uprooted or snapped off in a space of about a quarter of a mile square. The centre of the cyclone seems to have passed down a ditch, where it has levelled the rushes and grass as if a torrent of water had rushed down the "rhine."* Further on southwards is a small orchard, and here all the larger trees were torn to pieces, and then the wind passed along a lane, leaving very distinct traces in the hedge where the brambles and grasses were flattened and tumbled about in a very curious manner. At the end of this lane is a cottage facing south, and the wind coming up behind it (*i.e.*, going S.), or the sucking force exerted by the ascending whirl, blew out most of the windows into the garden, but fortunately did not unroof the house. From here the storm must have pretty nearly followed the course of the lane from East Bower to Dunwear (*i.e.*, going S.) as several trees are broken and uprooted as far as Mr. May's farm.

At the Bridgwater station the newspapers were scattered all over the platform, and the carriage works had a narrow escape from being unroofed, and some amount of damage was done. Passing over the low ground, the whirlwind next touched the trees round Mr. F. J. Thompson's grounds at Hamp, S.S.W. of Bridgwater, some apple trees were uprooted, and an elm was snapped off at some height from the ground, many smaller boughs were broken in the plantation near; and from an oak tree a large limb was wrenched off and flung over among the other boughs. The writer was at this moment, 4.25 p.m., standing at the end of Northfield (a street on the west side of Bridgwater), where the crashing of the falling trees could be distinctly heard, and the whirling clouds, and wind waving the distant trees had a very strange and awe-inspiring appearance.

In the lower part of Bridgwater the clouds seemed almost to touch the roofs, and the drifting masses of dark vapour were thought by many to be caused by a great fire near by. No doubt the phenomenon appeared under very different aspects at different stations, but from Northfield the sequence of events was in some such order as this :—At first a heavy thunderstorm passed from east to west, apparently between us and North Petherton, and in its rear another rapidly formed in the east and north-east. This then divided, part going towards the north, the other towards the south, while the whirlwind passed between them, the higher mountainous clouds

* Local name for a drainage stream on the level moors.

moving very slowly, and towering high into the air, whilst below, torn shreds of vapour were being whirled from all points of the compass, the centre of the storm especially being most marked, the clouds seeming to be rolled up and drawn into the intensely black thundercloud in the south, while in a few moments it cleared as if by magic in the north and east, as the rushing wind swept over the neighbouring trees. Both sections of the storm then seemed to join again, apparently over Combwich, and loud peals of thunder and bursting reports like cannon came from the solid black mass which entirely hid the distant hills while torrents of rain fell over Cannington and neighbourhood. One of the strangest parts of the phenomenon was the unearthly humming sound, caused by the whirlwind after it had again risen into the thundercloud, and which was plainly audible from the low fields for a considerable time in the distance.

The rainfall here was under half-an-inch for the whole 24 hours, and none fell during the whirlwind or immediately after, and at present no accurate record has been sent us as to the amount which fell where the storm passed subsequently. H. C.

[The above appeared in the *Bridgwater Independent* of June 13th, 1896, but has been specially revised by the writer before publication in the *Met. Mag.*—ED.]

EASTBOURNE, AUGUST 4TH.

At about ten minutes to one yesterday afternoon (Aug. 4th) some excitement was caused on the sea front at Eastbourne by a whirlwind, which, though confined to a very limited area, caused damage to several boats. The first gust of wind nearly sank a sailing boat which was lying at anchor about 100 yards from the shore. The mizen sail was torn off. Three rowing boats belonging to Mr. Sayers, and lying near the groyne opposite the East Sussex Club, were blown into the air, and whirled along as if they were paper kites. They were carried towards the end of the groyne, opposite the Victoria-place steps. A lady sitting on this groyne had a narrow escape. Had she not been blown off before the boats reached the spot where she was sitting, she must have sustained serious injury. Two of the boats, the Wave Queen and the Dauntless, were so much damaged that they had to be at once removed from the beach for repairs. The timbers of the third boat, the Sunbeam, were broken in one part, or loosened, and some of the stanchions were forced out. About a dozen persons, adults and children, were thrown down by the force of the wind, among them being some men who ran after the boats when they saw them flying through the air. The hats of people on the beach were blown off, and newspapers and pieces of paper were carried to a great height. In addition to the boats mentioned, a rowing boat belonging to Joseph Mockett was turned upside down. According to an eye-witness, the whirlwind seemed confined to a space of only a few yards wide.—*Standard*, August 5th.

REVIEWS.

Anales de la Oficina Meteorologica Argentina, por su Director G. G. DAVIS. Tomo ix. (2 parts) and x., 4to. Buenos Aires, 1893-6.

IT is impossible, in the space allotted, to do justice to these three portly volumes. We can only briefly indicate their contents. The first part of volume ix. is devoted to a brief description (unfortunately without a plan or a map) of Cordoba and its observatory, and to the printing in extenso of the majority of the observations taken there. It also contains the Director's report for the year 1889, with abstracts of the observations for that year at 16 stations, and the monthly rainfall at 27 stations on the Ferro-carril del Sud. We note that Dr. Davis has started an evaporation tank at Cordoba, somewhat smaller than, but much like those at Southampton and Camden Square, 3ft. 3in. × 3ft. 3in. instead of 6ft. × 6ft., but deeper, 2ft. 8in. instead of 2ft. The quantities in 1889 were—

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total.
Tank ...	(4·70)	2·66	3·74	2·85	1·88	1·81	2·77	3·18	3·88	5·54	5·57	5·31	... 43·89
Copper..	5·97	3·37	4·80	3·51	3·07	2·93	3·88	6·33	8·17	9·82	7·85	8·13	... 67·83
Ratio ...	1·27	1·27	1·28	1·23	1·63	1·62	1·40	1·99	2·10	1·78	1·41	1·53	... 1·55

This series of observations promises important information. We find in another part of the volume the totals for four subsequent years, adding 1889 (for which we computed the value for January) we have—

1889.	1890.	1891.	1892.	1893.		Mean.
43·89	51·52	40·59	44·45	39·15	.....	43·92 in.

Further on we find that Dr. Davis has attached recording apparatus to the tank, which apparatus is so delicate that he has to apply a correction for the expansion of the water in the tank due to the diurnal range of temperature. We do not dispute the necessity for this, but we should have thought that, if that has to be allowed for, there should be another correction applied for the size of the tank, for certainly its sides are longest when the water is hottest; and, therefore, when the water swells with temperature the tank gets larger. We doubt whether this correction may not be a case of "straining at a gnat," &c.

The volume is most interesting; one could spend hours over it and its diagrams—some of the latter are original and good.

Volume x., besides the annual reports for 1890 and 1891, gives summaries of all the observations hitherto made at—

Salta	Lat.	24°	32′	S. ;	Lon.	66°	14′	W. of G.
Tucuman	,,	26	50	;	,,	66	12	,,
Carcarana	,,	39	49	;	,,	61	8	,,
Villa Maria	,,	32	25	;	,,	63	14	,,

U.S. Department of Agriculture. Weather Bureau. Report of the Chief of the Weather Bureau, 1894. Government Printing Office, Washington, 1895 4to, 288 pages.

VERY similar to the volumes reviewed on p. 184 of our last volume, but noteworthy as being the first signed by the new chief, Prof. W. L. Moore.

It gives very little information respecting the operations of the office, possibly the details are given in some other document. We are glad to see a list of the publications up to date, such lists are always useful. Another new practice (we think adopted in the previous volumes of this series, but not mentioned in our review) which is very handy, is the binding of a leaf of strongly coloured paper between each section of the report, so that a glance at the edges shows where to turn to.

The tables of rainfall still give no information as to kind of rain gauge, or as to the height above the ground, or the altitude of the station. We do not understand why so very large a proportion of the stations are not complete for the year. We give the figures for the first six states :—

	Total Stations.	Perfect.	Imperfect. No.	Imperfect. Per cent.
Alabama	63	32	31	49
Alaska	5	2	3	60
Arizona.....	60	36	24	40
Arkansas	56	28	28	50
California.....	358	261	97	27
Colorado	98	48	50	51
Total.....	640	407	233	36

This shows that out of 1,000 stations, about 350 will be incomplete; more than ten times the proportion which are incomplete in this country. No matter how large be the total number of observers, there cannot be good work done as to secular variation, until this proportion of imperfect returns is reduced to a fifth, if not to a tenth, of what it was in 1894.

NEGATIVE RAYS AND THE AURORA.

A SERIES of experiments, relative to the action of a powerful magnetic field upon the negative rays in Crookes or Hittorf tubes, has been undertaken by Mr. Birkeland. These researches present some importance as regards the theory of the aurora borealis. M. Paulsen, the director of the Meteorological Institute of Copenhagen, claims that the aurora owes its origin to phosphorescence of the air produced in the upper regions of the atmosphere. Mr. Birkeland puts forth the idea that terrestrial magnetism may be the cause of such phosphorescence, which becomes intensified in the vicinity of the terrestrial poles.—*The Optician*, Aug. 20th.

HEAVY MONSOON RAIN IN SOUTHERN INDIA.

[WE have been favoured with the following letter from the Ven. Archdeacon Wynne, and we have reprinted the second from the *Sheffield Daily Telegraph*, of August 27th, as the similarity of the reports is striking. Fifty-one inches in eight days is very heavy, but we think that it was probably far surpassed by Cherra Poonjee in July, 1861, when the total for the month was 366·14 in., and in 1865, when the July fall was 208·40 in. We find that in the (for that station) dry month of August, 1851, 55·11 in. fell in the eight days ending August 14th. The fall at Nagina, Bijnore (lat. 29° N., lon. 78° E.), in September, 1880, reached 32·4 in. on one day, and 8·6 in. on the next, or 41 inches in *two* days. This was the rain which produced the disastrous landslip at Naini Tal. These stations it is true are in Northern India, whereas the following letters are from the South; but the rainfall on the Ghauts has long been known to be very heavy, for example, at Mahabuleshwur, in July, 1840, the total was 134·42 in.; and falls exceeding 10 inches per diem are frequent in June, July and August.—ED.]

RAINFALL IN THE ANAMULLAI MOUNTAINS, SOUTH INDIA.

SIR,—The mean annual rainfall in this station (Sothapara) is 75 inches. The greatest for some years was 108 in. in 1882. This year the fall was excessive. A letter just received says that the precipitation for June, 1896, was 75·78 in., and for July, 95 in. The greatest fall occurred in the eight days beginning with July 23rd. The daily record was as follows:—July 23rd, 6·79 in.; 24th, 8·25 in.; 25th, 5·05 in.; 26th, 4·65 in.; 27th, 6·28 in.; 28th, 5·87 in.; 29th, 6·23 in.; 30th, 7·93 in., making a total for 8 days = 51·05 in. Is this not a record?

Yours faithfully,

G. R. WYNNE.

Woodlawn, Killarney.

RAINFALL IN INDIA.

SIR,—In view of our deficient rainfall in England, some of your readers may be interested in hearing how their countrymen, coffee planters in India, are faring. I have letters before me from two correspondents in Mysore, whose plantations border the Western Ghauts. The monsoon (periodic rain and wind storms) began about June 15th, and from that date to August 1st there had been "130 inches of rain, or 25 inches more than our average annual rainfall; and we are only half-way through the monsoon. During the last eight days we have had 45 inches."

Thus in eight days the rainfall was considerably greater in Mysore than ours in England for the whole year. It is reported as "by far

the heaviest experienced during the last 25 years." At the same time "the wind has blown a hurricane for the last seven days, and we could hardly sleep, expecting each night that the roof would be blown off. Great damage has been done to the coffee estates; hundreds of shade trees torn up; numerous landslips, causing us the loss of about an acre of coffee trees here; roads washed away (on the hill sides); hardly a building but has suffered more or less."

So the lot of the British agriculturist abroad is not altogether a happy one, and by comparison the British climate after all is not one to grumble at. X.

August 25th, 1896.

WATERSPOUTS ON THE ATLANTIC.

One of the results of the remarkable weather which has prevailed across the Atlantic during the last two or three weeks has been the numerous waterspouts which have been observed by various vessels. One of these is described by Captain Friande, of the steamship Neustria, of the Faber line. A mass of dark clouds quickly gathered over the sky, and in a very little while the ship was in semi-darkness. The sea at the time was quite smooth, and the wind had fallen. Suddenly the most vivid lightning began to play incessantly, and the ship was encountering the most terrible electric storm ever experienced by the commander. Presently the lightning and thunder ceased, and as the ship emerged once more into the light, there was discerned about two miles away a rapidly moving waterspout whose base seemed about ninety feet thick, while its middle tapered to something like four feet in diameter, and its top was lost in the clouds. It approached within two hundred yards of the steamer, churning up the water as it moved, with a loud swishing sound. Many of the passengers were almost paralyzed with fear, expecting the column to overwhelm the ship, when suddenly it broke and came pouring down a little way astern, to be followed immediately by the growth of another one, which, however, did not approach the ship. In the same neighbourhood another ship, the London Hill, from Cochin, encountered another gigantic waterspout, which twisted and coiled and untwisted for some time, before it finally broke and fell into the water.

—*Daily News, August 31st*, 1896.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, MARCH, 1896.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	TotalRain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
England, London	65·2	22	29·4	15	53.3	39·9	41·0	83	103·2	24·9	3·20	25	7·3
Malta	68·7	29	46·2	13	63·6	54·1	50·1	82	132·3	40·0	1·03	8	6·3
Mauritius	84·4	3	68·6	15	82·1	72·1	68·9	79	134·8	61·4	3·51	15	5·8
Calcutta	101·2	28*a*	63·1	1	93·9	71·7	63·9	56	155·4	54·5	·15	1	1·9
Bombay	91·9	24	69·4	10	86·1	74·2	70·5	73	139·3	57·4	·00	0	0·9
Ceylon, Colombo	92·7	21	70·5	1	90·7	75·2	72·8	78	162·0	62·4	5·64	11	3·7
Melbourne	95·0	7	38·8	31	71·6	54·1	53·7	80	144·0	29·5	1·96	8	6·4
Adelaide	104·4	10	49·2	20	83·2	61·1	50·5	47	157·8	39·1	·43	3	5·2
Sydney	80·9	5	52·6	31	74·3	63·4	61·0	76	141·8	43·7	3·57	14	5·2
Wellington	75·0	24	42·0	13	65·9	55·3	52·2	74	134·0	35·0	8·29	17	5·0
Auckland	78·0	21	51·0	15	72·1	58·1	54·8	70	145·0	47·0	1·18	9	4·8
Jamaica, Kingston	89·3	29	65·1	5	85·8	69·0	66·0	74	...	...	·18	4	2·7
Trinidad	91·0	25*b*	61·0	15	87·7	68·8	69·6	76	174·0	60·0	1·59	11	...
Grenada	85·2	30	69 0	16	82·7	72·1	67·8	71	161·8	...	3·70	14	2·1
Toronto	53·1	29	4·8	13	31·0	15·6	19·0	76	70·2	—1·0	2·49	12	5·0
New Brunswick, Fredericton	54·8	26	—9·3	15	34·3	14·3	19·4	70	...	...	5·81	17	5·3
Manitoba, Winnipeg	48·9	27	—27·2	12	25·0	—0·2	...	...	...	...	1·85	14	4·7
British Columbia, Esquimalt	59·3	19	22·2	2	48·6	34·4	36·1	83	...	...	1·71	13	6·6

a—and 29. *b*—and 26.

REMARKS.

MALTA.—Adopted mean temp. 57°·0, or 1°·3 above the average. Mean hourly velocity of wind 12·1 miles. Average temp of sea 59°·0. Thunderstorm on 3rd; lightning on 30th. Dew-point ranged from 56°·3 to 42°·0. J. F. DOBSON.

Mauritius.—Mean temp. of air 1°·2 below, of dew point 0°·9 below, and rainfall 4·98 in. below, their respective averages. Mean hourly velocity of wind 10 miles, or equal to average; extremes, 23·2 on 8th, and 2·2 on 14th; prevailing direction, E.S.E. Lightning on 5th and 22nd; thunder on 28th and 29th. C. MELDRUM, F.R.S.

CEYLON, COLOMBO.—Thunderstorms occurred on the 9th, 10th, 26th and 29th. Lightning was seen on the 11th, 23rd, 24th and 27th. D. G. MANTELL.

Adelaide.—Mean temp. 1°·7 above the average of 39 years. A very dry month; rainfall ·64 in. below the average. C. TODD, F.R.S.

Sydney.—Rainfall 1·87 in. below, temperature 0°·4 below and humidity 0·7 below, their respective averages. After very dry weather during the whole of 1895, and January, 1896, excessively heavy rains (in one case 12 inches in six hours) fell over a small area, and since that the drought has set in again. H. C. RUSSELL, F.R.S.

Wellington.—Generally fine up to the 13th, with occasional showers and fresh N.W. wind; from 12th to 20th showers and strong N.W. winds; from 23rd to 27th heavy rain, wind S.E. Thunder on 26th and 31st; fog on 26th, 27th and 31st. Altogether an unpleasant month. Rainfall 4·75 in. above, or more than double, the average. R. B. GORE.

Auckland.—An unusually fine and dry month, the rainfall being much less than one-half the average. Mean temp. considerably above the average. T. F. CHEESEMAN.

JAMAICA, KINGSTON.—In Kingston, the weather was fair. Mean hourly velocity of wind 4·2 miles. Rainfall one-fourth of the average. R. JOHNSTONE.

TRINIDAD.—Rainfall ·28 in. below the 30 years average. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL, AUGUST, 1896.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger Hall.	2·51	XI.	Lake Vyrnwy	2·44
,,	Birchington, Thor	4·06	,,	Corwen, Rhug	1·92
,,	Hailsham	1·88	,,	Llanystumdwy, Talarvor	2·68
,,	Ryde, Thornbrough	2·21	,,	I. of Man, Douglas	2·25
,,	Emsworth, Redlands ...	2·03	XII.	Stoneykirk, Ardwell Ho.	1·92
,,	Alton, Ashdell	2·67	,,	New Galloway, Glenlee	2·32
III.	Oxford, Magdalen Col..	2·96	,,	Lilliesleaf, Riddell	1·72
,,	Banbury, Bloxham	1·72	XIII.	N. Esk Res. [Penicuick]	2·20
,,	Northampton, Sedgebrook	2·35	,,	Edinburgh, Blacket Pl..	1·79
,,	Alconbury	1·49	XIV.	Glasgow, Queen's Park..	1·64
,,	Wisbech, Bank House...	2·20	XV.	Inverary, Newtown	4·35
IV.	Southend	2·53	,,	Oban, The Corran	...
,,	Harlow, Sheering..... ...	4·16	,,	Islay, Gruinart Schools..	...
,,	Colchester, Lexden	3·26	XVI.	Dollar.....	1·96
,,	Rendlesham Hall	2·14	,,	Balquhidder, Stronvar...	3·49
,,	Rushall Vicarage	1·37	,,	Ballinluig	1·88
,,	Swaffham	1·98	,,	Dalnaspidal H.R.S.....	3·19
V.	Salisbury, Alderbury ...	2·09	XVII.	Keith H.R.S.....	3·61
,,	Bishop's Cannings	4·31	,,	Forres H.R.S.	1·96
,,	Blandford, Whatcombe.	1·67	XVIII.	Fearn, Lower Pitkerrie..	1·72
,,	Ashburton, Holne Vic...	2·00	,,	N. Uist, Loch Maddy ...	4·88
,,	Okehampton, Oaklands.	2·49	,,	Invergarry.....	3·45
,,	Hartland Abbey	1·98	,,	Aviemore H.R.S.	1·95
,,	Lynmouth, Glenthorne.	1·40	,,	Loch Ness, Drumnadrochit	1·78
,,	Probus, Lamellyn	1·87	XIX.	Invershin	2·98
,,	Wellington, The Avenue	1·95	,,	Scourie	7·40
,,	Wincanton, Stowell Rec.	2·03	,,	Watten H.R.S.....	1·92
VI.	Clifton, Pembroke Road	2·15	XX.	Dunmanway, Coolkelure	2·46
,,	Ross, The Graig	1·05	,,	Cork, Wellesley Terrace	1·19
,,	Wem, Clive Vicarage ...	1·56	,,	Killarney, Woodlawn ...	3·83
,,	Cheadle, The Heath Ho.	2·58	,,	Caher, Duneske	1·98
,,	Worcester, Diglis Lock	1·38	,,	Ballingarry, Hazelfort...	1·75
,,	Coventry, Coundon	2·29	,,	Limerick, Kilcornan ...	2·38
VII.	Ketton Hall [Stamford]	1·47	,,	Broadford, Hurdlestown	2·28
,,	Grantham, Stainby	1·93	,,	Miltown Malbay	4·20
,,	Horncastle, Bucknall ...	1·32	XXI.	Gorey, Courtown House	·81
,,	Worksop, Hodsck Priory	1·67	,,	Athlone, Twyford	2·66
VIII.	Neston, Hinderton	3·26	,,	Mullingar, Belvedere ...	2·06
,,	Southport, Hesketh Park	2·38	,,	Longford, Currygrane...	2·88
,,	Broughton-in-Furness ...	4·78	XXII.	Woodlawn	2·71
IX.	Ripon, Mickley.....	2·48	,,	Crossmolina, Enniscoe ..	4·05
,,	Melmerby, Baldersby ...	1·87	,,	Collooney, Markree Obs.	4·02
,,	Scarborough, Obs.	2·69	,,	Ballinamore, Lawderdale	2 29
,,	Middleton, Mickleton ...	2·05	XXIII.	Lough Sheelin, Arley...	2·64
X.	Haltwhistle, Unthank...	2·31	,,	Warrenpoint.....	1·40
,,	Bamburgh	2·10	,,	Seaforde..	1·60
,,	Keswick, The Bank.....	3·25	,,	Belfast, Springfield	2·73
XI.	Llanfrechfa Grange	1·81	,,	Bushmills, Dundarave..	3·07
,,	Llandovery	4·53	,,	Stewartstown	2·19
,,	Castle Malgwyn	3·40	,,	Killybegs	4·27
,,	Builth, Abergwesyn Vic.	4·66	,,	Lough Swilly, Carrablagh	4·22
,,	Rhayader, Nantgwillt...	4·11			

AUGUST, 1896.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours. Dpth	Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date	Min. Deg.	Min. Date.	No. of Nights below 32°. In shade.	On grass
		inches.	inches.	in.								
I.	London (Camden Square) ...	1·92	+ ·04	·37	24	14	77·1	13	45·4	27	0	0
II.	Maidstone (Hunton Court)...	2·82	+ 1·13	·90	9	10	...	...	...	...	..	...
,,	Strathfieldsaye	2·37	...	·68	19	15	...	...	...	...	...	...
III.	Hitchin	2·38	+ ·56	·49	31	15	73·0	13	42·0	4*e*	0	...
,,	Winslow (Addington)	2·90	+ ·93	·54	30	14	77·0	13	42·0	5,17	0	0
IV.	Bury St. Edmunds (Westley)	3·07	+ ·87	·64	27	15	72·0	13	43·0	27	0	...
,,	Norwich (Brundall)	1·64	...	·32	21	17	78·2	13	41·2	27	0	0
V.	Weymouth(LangtonHerring)	1·04	— ·89	·29	30	10	73·0	12*b*	46·0	27	0	...
,,	Torquay (Cary Green)	1·03	...	·20	30	11	76·4	23	46·2	27	0	0
,,	Polapit Tamar [Launceston]..	2·40	— ·08	·71	25	14	74·8	2	40·9	16	0	0
VI.	Stroud (Upfield)	2·13	+ ·04	·65	30	15	76·0	23	45·0	26	0	...
,,	ChurchStretton(Woolstaston)	1·34	— 1·42	·20	18*e*	18	70·5	11	43·0	26	0	...
,,	Tenbury (Orleton)	1·90	— ·22	·67	1	16	74·5	13	42·3	17	0	0
VII.	Leicester (Barkby)	2·99	+ ·55	·70	30	17	75·0	13	34·0	4	0	2
,,	Boston	1·65	— ·47	·31	19	15	75·0	13	42·0	5	0	...
,,	Hesley Hall [Tickhill].....	1·63	— ·53	·55	8	7	70·0	11*c*	41·0	28	0	...
VIII.	Manchester(PlymouthGrove)	2·69	— ·40	·85	23	19	73·0	17	39·0	26	0	...
IX.	Wetherby (Ribston Hall) ..	2·35	+ ·01	·69	31	10	...	...	...	...	...	...
,,	Skipton (Arncliffe)	2·72	— 1·61	1·13	23	15	..	...	...	...	...	...
,,	Hull (Pearson Park).	2·78	+ ·14	1·17	26	15	72·0	12*d*	41·0	26	0	...
X.	Newcastle (Town Moor)	2·00	— ·71	·43	14	17	...	...	...	...	...	...
,,	Borrowdale (Seathwaite).....	8·73	+ ·28	1·95	23	21	...	...	...	...	...	...
XI.	Cardiff (Ely).....	3·00	— ·61	·87	19	15	...	...	...	...	...	...
,,	Haverfordwest	2·39	— ·79	·52	18	15	72·3	1	42·2	17	0	0
,,	Aberystwith (Gogerddan) ...	4·46	...	1·18	18	19	73·0	1	...	...	...	...
,,	Llandudno.....	2·81	+ ·45	·85	31	18	68·0	12	49·8	5	0	...
XII.	Cargen [Dumfries]	1·86	— 1·13	·52	29	10	71·8	11	40·0	10	0	0
,,	Jedburgh (Sunnyside).....	·85	— 1·39	·20	18*g*	9	74·0	11	39·0	10	0	...
XIV.	Colmonell	3·03	...	·62	12	13	71·0	1,12	39·0	4	0	...
XV.	Lochgilphead (Kilmory).....	3·83	— ·73	·55	17	17	...	...	40·0	4	0	...
,,	Mull (Quinish).....	6·36	+ 2·21	1·43	28	19	...	...	...	...	...	...
XVI.	Loch Leven Sluices	3·00	+ ·06	·90	24	12	...	...	...	...	...	...
,,	Dundee (Eastern Necropolis)	1·85	— ·72	·55	23	18	73·0	11	40·2	26	0	...
XVII.	Braemar	1·63	— 1·70	·24	12*a*	21	69·8	11	32·8	10	0	3
,,	Aberdeen (Cranford)	2·41	...	·50	14	20	68·0	11	35·0	25	0	..
XVIII	Strathconan [Beauly]	3·15	— ·15	·50	31	14	...	...	...	...	...	...
,,	Glencarron Lodge.....	6·79	...	2·49	28	25	65·2	31	39·0	5	0	...
,,	Cawdor	2·09	— ·16	·40	7	18	...	...	...	...	...	...
XIX.	Dunrobin	...	...	...	..	...	...	..	...	...	...	...
,,	S. Ronaldsay (Roeberry).....	2·82	+ ·26	·68	28	21	63·0	18	43·0	16*f*	0	...
XX.	Darrynane Abbey.....	2·82	...	·84	17	17	...	...	...	...	...	...
,,	Waterford (Brook Lodge) ...	1·17	— 2·25	·27	26	12	74·0	12*d*	42·0	6	0	...
,,	O'Briensbridge (Ross)	2·93	...	·62	26	13	...	...	...	...	...	...
XXI.	Carlow (Browne's Hill)	1·35	— 1·62	·27	25	12	...	..	...	...	...	...
,,	Dublin (FitzWilliam Square)	1·14	— 1·38	·17	17	18	71·1	23	45·6	26	0	0
XXII.	Ballinasloe	2·30	— ·88	·66	23	16	71·0	1	42·0	6	0	...
,,	Clifden (Kylemore)	7·03	...	1·45	29	19	...	...	...	...	...	...
XXIII	Waringstown	2·57	— ·54	·70	18	15	75·0	1	37·0	30	0	0
,,	Londonderry (Creggan Res.).	3·73	— ·39	·76	25	20	...	...	...	...	...	...
,,	Omagh (Edenfel)	2·49	— 1·00	·48	23	21	66·0	1	35·0	9	0	...

ENGLAND. WALES. SCOTLAND. IRELAND.

+Shows that the fall was above the average ; —that it was below it.

a—and 14. *b*—and 24. *c*—and 12, 13. *d*—and 13. *e*—and 26. *f*—and 25, 27. *g*—and 23.

METEOROLOGICAL NOTES ON AUGUST, 1896.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

ADDINGTON.—With one exception, the largest August rainfall since 1881, the exception being 1891, which gave nearly five inches. During the TS on the 26th a good deal of H fell in the neighbourhood, followed by a cold night.

BURY ST. EDMUNDS, WESTLEY.—The month was favourable for harvest work till the 18th; after that time much the reverse, the barley then cut is much grown and discoloured. About 5.30 p.m., on August 28th, a remarkably bright zenithal halo was seen for about ten minutes. The colours were quite as bright as any rainbow. Distant T on 8th and 26th; TS on 19th.

NORWICH, BRUNDALL.—The coolest August since 1888, and the driest since 1885; but few really warm summer days, and a great prevalence of cloud at times. L on 7th, 19th and 25th, and much T with L on the afternoon and evening of the 26th.

WEYMOUTH, LANGTON HERRING.—Mean temp. at 9 a.m. 60°·9, 1°·1 below the average. T on 8th; T and L on 26th. The total R for the first eight months of this year is 8·67 in., or only 52 per cent. of the average. The previous smallest rainfall for the first 8 months of the year was 11·24 in. in 1887. Smallest rainfall for consecutive days—

	in.		in.
Jan. 8 to Aug. 25, 1887,	230 days, 7·56	Dec. 31, 1895, to Aug. 16, 1896,	230 days, 7·73
„ 7 „ „ „ „	231 „ 7·92	„ 30, „ „ „ „ „	231 „ 7·73
		„ „ „ „ „ 31, „	246 „ 8·73
		Jan. 4, 1887 „ Sept. 6, 1887,	246 „ 11·20

The drought of this year has been longer and more severe than that of 1887.

TORQUAY, CARY GREEN.—Rainfall 1·81 in. below the average; the fall of eight months, January to August, being 11·64 in. below the average. Mean temp. 61°·0, or 0°·4 below the average. Duration of sunshine 209 hours 25 mins., being 21 hours 45 minutes above the average. One sunless day.

POLAPIT TAMAR [LAUNCESTON].—The first three weeks were very dry, but during the last week 1·75 in. fell. The rainfall to the end of the month from January 1st is 7·77 in. below the average. Fogs on the 1st, 2nd, 11th, and 13th. Heavy TS at 2.45 p.m. on 1st; distant T on 2nd; heavy T and vivid L with R at 5.45 p.m. of the 8th.

STROUD, UPFIELD.—T on the 1st, 8th, 23rd and 26th; T and L on 25th.

WOOLSTASTON.—The dry weather continued till the 17th, after which R fell lightly almost every day. The harvest was secured in good condition by the end of the third week. Mean temp. 57°·3.

LEICESTER, BARKBY.—Rainfall gradually creeping up, total for year so far 13·75 in. Mean temp. for the month, 57°·4. L on 19th; T on 21st, 25th and 26th.

BOSTON.—The harvest was one of the earliest on record, new wheat being first shown in Boston market on the 5th, or 18 days earlier than the average of the previous 30 years; the yield and quality are both good.

MANCHESTER, PLYMOUTH GROVE.—No summer weather prevailed during the month, but upon the whole it was dull, cold and unsettled. Mean temp. 57°·5, the lowest for August since observations commenced in 1868, with one exception, namely August, 1885, which was the same.

HULL, PEARSON PARK.—TS on 19th, TS with H and R on the 26th.

WALES.

HAVERFORDWEST.—The temp. of this month was much lower than July; no extreme heat prevailed, and only on four days did the temp. exceed 70°,

but the nights, with one or two exceptions, were rather above the mean. Although the rainfall was small, yet the continual drippings from the 17th to the end of the month, in conjunction with the temperate heat and the bright sunshine, went a great way towards neutralizing the effect of the long drought. Grass lands recovered wonderfully, and root crops (probably resown in many places) promise to be good. Prevailing winds W.N.W. and N.W. T8 on 1st. Aurora on 15th, 16th, and 27th. Fog on 23rd.

ABERYSTWITH, GOGERDDAN.—Very showery throughout the month.

SCOTLAND.

CARGEN [DUMFRIES].—The mean temp. of the month is 1°·5 below the average, and has only in seven, out of 37 years been lower. Rainfall is the lightest registered in any year since 1884, and has only four times been less since observations commenced in 1860. With the exception of ·12 in. registered on the 12th, the wet weather occurred entirely in the latter half of the month. The heavy R during the night of the 29th was coincident with a sudden rise of temp., and was accompanied by a severe gale from S.W. Easterly winds prevailed for 15 days, distant T was heard on 26th. Almost all the corn in the immediate district was in the stackyards by the 22nd, about four weeks sooner than last year. The turnip crop promises to be one of the best on record, and pastures have seldom been more luxuriant at this season, fears are, however, entertained respecting the potatoe crop, owing to the prevalence of "disease." Distant T on 26th.

JEDBURGH.—The weather was characterised by great dryness for August, with a good deal of sunshine. The result was that vegetation made great progress. The cereal crops were begun to be cut in the first week, and in the early districts the most of it has been stacked in the finest order, a very unusual thing in August. Potatoes and turnips promise well.

COLMONELL.—Rainfall 1·02 in. below the average of 20 years. Mean temp. 1°·1 below the average.

ABERDEEN, CRANFORD.—The month was cold, with little sunshine.

S. RONALDSAY, ROEBERRY.—A sunless damp month. Mean temp. 53°·1, or 0°·9 below the average of six years.

IRELAND.

DARRYNANE ABBEY.—A dry month. The first half fine and warm, the second rather cold. Strong northerly gale on 26th.

O'BRIENSBRIDGE, ROSS.—A splendid harvest month up to the 17th, but the latter part changeable, with strong gales, veering from S.W. to N.W. The nights cold.

DUBLIN.—A cool, breezy, showery month, with a remarkable prevalence of N. and N.W. winds. The amount of cloud was very large in the mornings, but the evening skies were much freer from cloud. Mean temp. 58°·3, or 1°·4 below the average. The rainfall was much below, while the rainy days were considerably in excess of, the average. High winds were noted on as many as 13 days, and attained the force of a gale on three occasions, 13th, 24th, and 30th. T occurred on the 26th. Lunar halos were seen on the 19th, 24th, and 27th. Temp. reached 70° in the screen on 2 days. H fell on the 26th.

WARINGSTOWN.—The first half of the month was very dry and hot, the second half wet and blustery.

OMAGH, EDENFEL.—The first half of the month was very fine, although cool and with occasional light showers, but from the 17th to the end there was constant cool, rainy, and sunless weather, delaying and interfering with what had promised to be an early and abundant harvest.